



Alignment Document

State of California And Aventa Learning Algebra I

Algebra I 2005-2007 Benchmark Blueprint

State Standard Number	State Standard Area / Description	Unit Name	Course Topic Description
AI	Algebra I		
AI.1.0	Students identify and use the arithmetic properties of subsets of integers and rational, irrational, and real numbers, including closure properties for the four basic arithmetic operations where applicable:	Variables and Expressions	Some Useful Properties
		Real Numbers	Closure and Properties of Equality
		Equations	More Properties of Equality
AI.1.1	Students use properties of numbers to demonstrate whether assertions are true or false.	Variables and Expressions	Addition of Integers
		Variables and Expressions	The Distributive Property
		Variables and Expressions	The Associative Property
		Variables and Expressions	The Commutative Property
		Real Numbers	Number Sets
		Real Numbers	Order of Numbers
		Real Numbers	Evaluating Division Expressions
		Real Numbers	Writing and Justifying Steps Using Properties
		Real Numbers	Properties of Closure and Equality

AI.2.0	Students understand and use such operations as taking the opposite, finding the reciprocal, taking a root, and raising to a fractional power. They understand and use the rules of exponents.	Variables and Expressions	Fractional Exponents
		Variables and Expressions	Problem Solving using Exponents and Roots
		Variables and Expressions	Exponents
		Variables and Expressions	Roots
		Real Numbers	Division of Rational Numbers
AI.3.0	Students solve equations and inequalities involving absolute values.	Equations	Absolute Value Equations
		Inequalities	Absolute Value Inequalities
AI.4.0	Students simplify expressions before solving linear equations and inequalities in one variable, such as $3(2x - 5) + 4(x - 2) = 12$.	Equations	Rate Problems
		Equations	Parentheses in Equations
		Equations	Equations with Variables on Each Side
AI.5.0	Students solve multistep problems, including word problems, involving linear equations and linear inequalities in one variable and provide justification for each step.	Equations	Formulas as Equations
		Equations	Solving Multi-Step Equations
		Equations	Parentheses in Equations
		Equations	Equations with Variables on Each Side
		Equations	Mixture Problems, Work Problems, Rate Problems
		Inequalities	Multi-Step Inequalities

AI.6.0	Students graph a linear equation and compute the x-and y-intercepts (e.g., graph $2x + 6y = 4$). They are also able to sketch the region defined by linear inequality (e.g., they sketch the region defined by $2x + 6y < 4$).	Functions and Linear Equations	Graphing an Equation Using Intercepts
		Functions and Linear Equations	Graphing an Equation Using Points
		Functions and Linear Equations	Graphing an Equation Using Slope and Y-Intercept
		Solving Systems	Review of Graphing Inequalities
		Solving Systems	Review of Graphing Linear Equations
		Inequalities	Inequalities in Two Variables
		Inequalities	Graphing Inequalities in Two Variables
AI.7.0	Students verify that a point lies on a line, given an equation of the line. Students are able to derive linear equations by using the point-slope formula.	Functions and Linear Equations	Point-Slope Form
		Functions and Linear Equations	Forms of Non-Vertical Linear Equations
		Functions and Linear Equations	Graphing an Equation Using Slope and Y-Intercept
		Functions and Linear Equations	Linear Patterns
AI.8.0	Students understand the concepts of parallel lines and perpendicular lines and how those slopes are related. Students are able to find the equation of a line perpendicular to a given line that passes through a given point.	Functions and Linear Equations	Perpendicular Lines
		Functions and Linear Equations	Parallel Lines



AI.9.0	Students solve a system of two linear equations in two variables algebraically and are able to interpret the answer graphically. Students are able to solve a system of two linear inequalities in two variables and to sketch the solution sets.	Solving Systems	Problem Solving
		Solving Systems	Systems of equations
		Solving Systems	Problem Solving with Systems
		Solving Systems	Solving with Substitution
		Solving Systems	Graphing Systems of Inequalities
		Solving Systems	Solving with Elimination
AI.10.0	Students add, subtract, multiply, and divide monomials and polynomials. Students solve multistep problems, including word problems, by using these techniques.	Variables and Expressions	Multiplying Monomials
		Variables and Expressions	Dividing Monomials
		Polynomials	Multiplying Using FOIL
		Polynomials	Multiplying Monomials Review
		Polynomials	Multiplying Polynomials
		Polynomials	Addition and Subtraction of Polynomials
		Polynomials	Special Products
		Polynomials	Multiplying Polynomials by a Monomial
AI.11.0	Students apply basic factoring techniques to second- and simple third-degree polynomials. These techniques include finding a common factor for all terms in a polynomial, recognizing the difference of two squares, and recognizing perfect squares of binomials.	Polynomials	Factoring Perfect Square Trinomials
		Polynomials	Factoring Simple Trinomials
		Polynomials	Factoring with the GCF
		Polynomials	Difference of Two Squares
		Polynomials	Factoring Other Trinomials

AI.12.0	Students simplify fractions with polynomials in the numerator and denominator by factoring both and reducing them to the lowest terms.	Rational Expressions	Simplifying Rational Expressions
		Variables and Expressions	Dividing Monomials
AI.13.0	Students add, subtract, multiply, and divide rational expressions and functions. Students solve both computationally and conceptually challenging problems by using these techniques.	Rational Expressions	Adding with Like Denominators
		Rational Expressions	Dividing Rational Expressions
		Rational Expressions	Polynomial Long Division
		Rational Expressions	Multiplying Rational Expressions
		Rational Expressions	Unlike Denominators
		Rational Expressions	Dividing Polynomials by a Monomial
AI.14.0	Students solve a quadratic equation by factoring or completing the square.	Quadratics and Radicals	Completing the Square
		Polynomials	Factoring Other Trinomials
		Polynomials	Solving Equations by Factoring Trinomials
AI.15.0	Students apply algebraic techniques to solve rate problems, work problems, and percent mixture problems.	Equations	Mixture Problems
		Equations	Mixture Problems, Work Problems, Rate Problems
AI.16.0	Students understand the concepts of a relation and a function, determine whether a given relation defines a function, and give pertinent information about given relations and functions.	Functions and Linear Equations	Relations
		Functions and Linear Equations	Functions



AI.17.0	Students determine the domain of independent variables and the range of dependent variables defined by a graph, a set of ordered pairs, or a symbolic expression.	Functions and Linear Equations	Relations
		Functions and Linear Equations	Replacement Sets and Variables
AI.18.0	Students determine whether a relation defined by a graph, a set of ordered pairs, or a symbolic expression is a function and justify the conclusion.	Functions and Linear Equations	Relations
		Functions and Linear Equations	Functions
AI.19.0	Students know the quadratic formula and are familiar with its proof by completing the square.	Quadratics and Radicals	The Quadratic Formula
AI.20.0	Students use the quadratic formula to find the roots of a second-degree polynomial and to solve quadratic equations.	Quadratics and Radicals	The Quadratic Formula
AI.21.0	Students graph quadratic functions and know that their roots are the x-intercepts.	Quadratics and Radicals	Graphing Quadratics
		Quadratics and Radicals	Graphing Quadratic Functions
AI.22.0	Students use the quadratic formula or factoring techniques or both to determine whether the graph of a quadratic function will intersect the x-axis in zero, one, or two points.	Quadratics and Radicals	Solving Quadratic Equations with Graphs
		Quadratics and Radicals	The Quadratic Formula
		Polynomials	Solving Equations by Factoring Trinomials
AI.23.0	Students apply quadratic equations to physical problems, such as the motion of an object under the force of gravity.	Quadratics and Radicals	Solving Quadratic Equations with Graphs
		Quadratics and Radicals	The Quadratic Formula
AI.24.0	Students use and know simple aspects of a logical argument:	Variables and Expressions	Logic and Graphs
AI.24.1	Students explain the difference between inductive and deductive reasoning and identify and provide examples of each.	Variables and Expressions	Inductive Reasoning



AI.24.2	Students identify the hypothesis and conclusion in logical deduction.	Variables and Expressions	Logical Reasoning
AI.24.3	Students use counterexamples to show that an assertion is false and recognize that a single counterexample is sufficient to refute an assertion.	Variables and Expressions	Deductive Reasoning
AI.25.0	Students use properties of the number system to judge the validity of results, to justify each step of a procedure, and to prove or disprove statements:	Variables and Expressions	Some Useful Properties
		Real Numbers	Closure and Properties of Equality
		Equations	More Properties of Equality
AI.25.1	Students use properties of numbers to construct simple, valid arguments (direct and indirect) for, or formulate counterexamples to, claimed assertions.	Real Numbers	Using the Properties
		Real Numbers	Properties of Closure and Equality
AI.25.2	Students judge the validity of an argument according to whether the properties of the real number system and the order of operations have been applied correctly at each step.	Real Numbers	Using the Properties
		Real Numbers	Properties of Closure and Equality
		Real Numbers	Evaluating Expressions
		Real Numbers	Evaluating Division Expressions
		Real Numbers	Writing and Justifying Steps Using Properties
		Variables and Expressions	Order of Operations



AI.25.3	Given a specific algebraic statement involving linear, quadratic, or absolute value expressions or equations or inequalities, students determine whether the statement is true sometimes, always, or never.	Inequalities	Graphing Inequalities in Two Variables
		Inequalities	Absolute Value Inequalities
		Inequalities	Compound Inequalities
		Inequalities	Solving Inequalities Using Multiplication and Division
		Inequalities	Inequalities in Two Variables
		Equations	Solving Problems
		Functions and Linear Equations	Slope-Intercept Form
		Quadratics and Radicals	Solving Quadratic Equations with Graphs
		Quadratics and Radicals	Solving by Using Square Roots